

## CLAIMS

- Sub W 1
1. A reader for an electronic radio frequency identification system also comprising a plurality of transponders to be read by the reader, the reader comprising:
    - a first recovery circuit for recovering and separating an upper sideband and a lower sideband of a modulated response signal from one of the transponders; and
    - a first evaluating circuit for evaluating and selecting one of the upper sideband and the lower sideband for output to a next stage, based on the evaluation.
  2. A reader as claimed in claim 1 wherein the evaluating circuit evaluates the upper sideband and lower sideband on signal to noise ratio criteria.
  3. A reader as claimed in claim 1 wherein the evaluating circuit evaluates the upper sideband and the lower sideband on minimum errors in data decoded from the sidebands.
  4. A reader as claimed in claim 1 wherein the first recovery circuit comprises an image reject mixer having a first output for the lower sideband and a second output for the upper sideband.

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5. A reader as claimed in claim 4 comprising a switch for selecting between the first output and the second output in response to a selection signal from the evaluating circuit.
6. A reader as claimed in claim 5 wherein an output of the switch is connected to a first data decoder circuit for providing decoded data.
7. A reader as claimed in claim 1 comprising an energizing signal generator for energizing passive transponders.
8. A reader as claimed in claim 7 wherein the energizing signal generator is connected to the image reject mixer to convert the response signal down to baseband.
9. A reader as claimed in claim 8 comprising a single antenna for transmitting the energizing signal and for receiving the response signal.
10. A reader as claimed in claim 9 wherein the antenna is connected to the energizing signal generator by a strip line.

11. A reader as claimed in claim 9 wherein the response signal is coupled to the first recovery circuit by a first directional coupler cooperating with the strip line.
12. A reader as claimed in claim 1 comprising a second recovery circuit for recovering and separating an upper sideband and a lower sideband of a modulated response signal from one of the transponders.
13. A reader as claimed in claim 12 wherein the response signal is coupled to the second recovery circuit by a second directional coupler cooperating with the strip line.
14. A reader as claimed in claim 13 wherein the first and second directional couplers are spaced from one another an electrical distance of between  $\lambda_c/4$  to  $\lambda_c/6$  along the strip line.
15. A reader as claimed in claim 12 wherein the second recovery circuit comprises a second image reject mixer having a first output for the lower sideband and a second output for the upper sideband.

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16. A reader as claimed in claim 15 comprising a second switch for selecting between the first output and the second output of the second mixer in response to a selection signal from the evaluating circuit.
17. A reader as claimed in claim 16 wherein an output of the second switch is connected to a second data decoder for providing decoded data.
18. A reader as claimed in claim 17 wherein an output of the first data decoder and an output of the second data decoder are connected to a selection switch and wherein the selection switch is operative to connect a selected one of the output of the first data decoder and the output of the second data decoder to an output of the selection switch in response to a control signal from the evaluating circuit and based on minimum requirements for errors in the decoded data.
19. An electronic radio frequency identification system comprising a plurality of transponders and a reader as claimed in claim 1.
20. A method of reading a response signal from an electronic radio frequency transponder, the method comprising the steps of:

- receiving the signal;
- utilizing demodulating techniques to recover and separate an upper sideband and a lower sideband of the signal;
- evaluating the upper and lower sidebands; and
- utilizing best performance criteria automatically to select one of the upper sideband and the lower sideband for further processing.

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